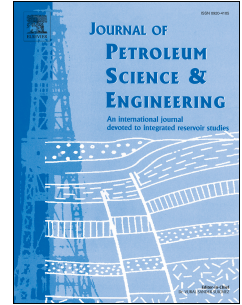


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Pressure transient behaviors of hydraulically fractured horizontal shale-gas wells by using dual-porosity and dual-permeability model

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1 **Pressure Transient Behaviors of Hydraulically Fractured Horizontal**
2 **Shale-gas Wells by Using Dual-Porosity and Dual-Permeability**
3 **Model**

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10 **Abstract:** A dual-porosity and dual-permeability (DPDP) model was developed to describe the
11 fluids flow and transient pressure behaviors of multistage hydraulically fractured horizontal wells
12 in shale-gas reservoirs by incorporating gas adsorption and gas permeability corrections. This
13 3-dimensional, 1-phase numerical model was developed using finite volume method and solved
14 implicitly with unstructured PEBI (Perpendicular Bisection) gridding. Parametric studies were
15 conducted to understand the pressure transient behaviors with effects of gas adsorption,
16 permeability correction, transmissibility between fracture and matrix system (called inter-porosity
17 flow ability, IPF), and natural fracture spacing. The results showed that pressure transient
18 behaviors were not only controlled by the individual ultimate adsorption capacity (UAC) and IPF
19 but rather the combination of IPF ability and UAC derived herein. The physics was that for a
20 block by omitting the flow in matrix systems and accumulation term, the flow rate of free gas
21 between the matrix cell and the fracture cell was equal to the flow rate caused by adsorbed or
22 desorbed due to a pressure change in the matrix cell. This was the reason that if the IPF ability

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